

Claims:

1. A programmable cylinder lock comprising:
 - a substantially cylindrical core having front and back ends and a keyway having a key entry at the core front end and extending along the core longitudinal axis toward a core back end, the keyway having opposed top and bottom walls and opposed left and right sidewalls shaped to closely receive a key blade having opposed top and bottom edges and opposed left and right flanks;
 - 10 a substantially cylindrical shell having a longitudinal bore closely coaxially surrounding the outer surface of the core, wherein the core has a neutral position within the shell such that the keyway top and bottom are at 0 and 180 degree positions, respectively, relative to the axis when viewed from the keyway entry and the core can rotate within the shell bore when a properly coded key is fully inserted in the keyway;
 - 15 a plurality of tumbler bores located in the shell and penetrating the shell bore at a 0 degree angle relative to the neutral position of the core;
 - a respective plurality of tumblers located in the tumbler bores and biased toward the shell bore so as to contact the core;
 - 20 a plurality of pin bores extending a uniform distance from the outer surface of the core to penetration of at least one keyway sidewall at an intermediate angle to the axis;
 - 25 an activator pin in at least one of the pin bores, said activator pin having a length substantially equal to said uniform distance and a shape for interacting with the pin bore such that the pin can freely enter into the keyway; and
 - a filler pin in at least one of the pin bores, said filler pin having a length no greater than said uniform distance and a shape for interacting with the pin bore such that the pin cannot enter into the keyway.

2. The programmable cylinder lock of claim 1, wherein at least three bores are provided on at least one side of the core.

5 3. The programmable cylinder lock of claim 1, wherein said plurality of pin bores and pins comprises:

10 a plurality of left side pin bores extending a uniform distance from the outer surface of the core to penetration of the keyway left sidewall, at a first intermediate angle to the axis, and a plurality of right side pin bores extending a uniform distance from the outer surface of the core to penetration of the keyway right sidewall, at a second intermediate angle to the axis;

15 an activator pin in at least one of a left side pin bore or a right side pin bore, said activator pin having a length substantially equal to said uniform distance and a shape for interacting with the pin bore such that the pin can freely enter into the keyway; and

20 a filler pin in at least one left side pin bore or at least one right side pin bore, said filler pin having a length no greater than said uniform distance and a shape for interacting with the pin bore such that the pin cannot enter into the keyway.

4. The programmable cylinder lock of claim 3, wherein the first and second intermediate angles are 270 and 90 degrees.

25 5. The programmable cylinder lock of claim 3, wherein at least four bores are provided on each side of the core.

6. The programmable cylinder lock of claim 5, wherein at least six bores are provided on each side of the core.

7. The programmable cylinder lock of claim 6, wherein each of five of the at least six bores on each side of the core contains an activator pin or a filler pin and one more bore, closest to the back of the core,
5 contains a blocking pin.

8. A programmable core for a cylinder lock comprising:
a substantially cylindrical core having an outer surface, front and back ends and a keyway having a key entry at the core front end and extending
10 along the core longitudinal axis toward a core back end, the keyway having opposed top and bottom walls and opposed left and right sidewalls shaped to closely receive a key blade having opposed top and bottom edges and opposed left and right flanks, such that the keyway top and bottom are at 0 and 180 degree positions, respectively, relative to the axis when viewed
15 from the keyway entry; and

said outer surface being imperforate at the 0 degree position relative to the axis and having at least three left side pin bores extending a uniform distance from the outer surface of the core to penetration of the keyway left sidewall, at a first intermediate angle to the axis, and at least three right side
20 pin bores extending a uniform distance from the outer surface of the core to penetration of the keyway right sidewall, at a second intermediate angle to the axis.

9. The programmable core for a cylinder lock of claim 8, wherein
25 the first and second intermediate angles are 270 and 90 degrees.

10. The programmable core for a cylinder lock of claim 8, wherein at least six bores are provided on each side of the core.

11. A programmable core kit for a cylinder lock comprising:

a substantially cylindrical core having an outer surface, front and back ends and a keyway having a key entry at the core front end and extending along the core longitudinal axis toward a core back end, the keyway having

5 opposed top and bottom walls and opposed left and right sidewalls shaped to closely receive a key blade having opposed top and bottom edges and opposed left and right flanks, such that the keyway top and bottom are at 0 and 180 degree positions, respectively, relative to the axis when viewed from the keyway entry;

10 said outer surface being imperforate at the 0 degree position relative to the axis and having at least three left side pin bores extending a uniform distance from the outer surface of the core to penetration of the keyway left sidewall, at a first intermediate angle to the axis, and at least three right side pin bores extending a uniform distance from the outer surface of the core to

15 penetration of the keyway right sidewall, at a second intermediate angle to the axis;

20 a plurality of activator pins insertable into any of said pin bores, each having a head, a stem, and an overall length substantially equal to said uniform distance, for interacting with the pin bore such that the stem can freely enter into the keyway with the head recessed from the core outer surface; and

25 a plurality of filler pins insertable into any of said pin bores, each having a head, a stem, and an overall length no greater than said uniform distance, for interacting with the pin bore such that the head is substantially flush with the core outer surface and the stem cannot enter into the keyway.

12. The programmable core kit for a cylinder lock of claim 11, wherein at least six bores are provided on each side of the core.

13. The programmable core kit for a cylinder lock of claim 11, wherein the first and second intermediate angles are 270 and 90 degrees.

14. The programmable core kit of claim 11, including a plurality of 5 blocking pins insertable into any of said pin bores, each having a head, a stem, and an overall length that is greater than said uniform distance, for interacting with the pin bore such that the head is substantially flush with the core outer surface and the stem enters into the keyway.

10 15. The programmable core kit for a cylinder lock of claim 14, wherein the first and second intermediate angles are 270 and 90 degrees.

16. A cylinder lock system comprising:

a substantially cylindrical core having front and back ends and a 15 keyway having a key entry at the core front end and extending along the core longitudinal axis toward a core back end, the keyway having opposed top and bottom walls and opposed left and right sidewalls shaped to closely receive a key blade having opposed top and bottom edges and opposed left and right flanks;

20 a substantially cylindrical shell having a longitudinal bore closely coaxially surrounding the outer surface of core, wherein the core has a neutral position within the shell such that the keyway top and bottom are at 0 and 180 degree positions, respectively, relative to the axis when viewed from the keyway entry and the core can rotate within the shell bore when a 25 properly coded key is fully inserted in the keyway;

a plurality of tumbler bores located in the shell and penetrating the shell bore at a 0 degree angle relative to the neutral position of the core;

a respective plurality of tumblers located in the tumbler bores and biased toward the shell bore so as to contact the core;

a plurality of left side pin bores extending a uniform distance from the outer surface of the core to penetration of the keyway left sidewall, at a first intermediate angle to the axis, and a plurality of right side pin bores extending a uniform distance from the outer surface of the core to penetration of the keyway right sidewall, at a second intermediate angle to the axis;

5 an activator pin in at least one of a left side pin bore or a right side pin bore, said activator pin having a length substantially equal to said uniform distance and a shape for interacting with the pin bore such that the pin can freely enter into the keyway;

10 an activator pin in at least one of a left side pin bore or a right side pin bore, said activator pin having a length no greater than said uniform distance and a shape for interacting with the pin bore such that the pin cannot enter into the keyway; and

15 a key insertable into the keyway, said key having a blade with top and bottom edges and left and right flanks, each of the flanks having a longitudinal channel spaced from the keyway sidewall and alignable with said plurality of left side pin bores and right side pin bores, respectively, at least one of the channels having a raised node alignable with and closely approaching a pin bore.

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17. The cylinder lock system of claim 16, wherein at least four bores are provided on each side of the core.

25 18. The cylinder lock system of claim 17, wherein at least six bores are provided on each side of the core.

19. The cylinder lock system of claim 18, wherein each of five of the at least six bores on each side of the core contains an activator pin or a

filler pin and one more bore, closest to the back of the core, contains a blocking pin.

20. A key for insertion into a cylinder lock keyway having left and
5 right keyway walls defining a keyway width, comprising:

a bonnet for grasping with fingers; and

a blade extending from the bonnet and having top and bottom edges and left and right flanks with opposed planar surfaces defining a key nominal thickness corresponding to the keyway width, each of the flanks having a
10 recessed longitudinal channel, each channel having at least one raised node at a respective planar surface.

21. The key claim of claim 20, wherein each channel has at least one node.

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22. The key claim of claim 20, wherein the key has at least two nodes.

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23. The key claim of claim 20, wherein the key has at least three nodes.

24. The key claim of claim 21, wherein the key has at least three nodes.